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SOVIET COMMENTATORS DISCUSS US INTELLIGENCE GATHERING TECHNIQUES

by

B. Aleksandrov and A. Yur'yev

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13. ABSTRACT

The authors, using materials from the Western press briefly describe a number of U. S. intelligence-gathering satellites and their missions, in the period from 1960 to the present, including "Samos", "Ferret", "Midas", "Vela Hotel". Brief mention is also made of a project "949" satellite which is due to be launched in 1974.

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SOVIET COMMENTATORS DISCUSS US INTELLIGENCE GATHERING TECHNIQUES

Writing in the /Soviet/ publication Smena, Major General of the Air Force B. Aleksandrov and Colonel A. Yur'yev have authored a military-technical review article under the imposing title "Space Espionage Networks," followed, in smaller type, by the subcaption "Based on foreign published material."

There is, of course, nothing classified in this Soviet military commentary. What actual secret material does fall into the hands of Soviet military authorities is put to uses far different than publication. The Aleksandrov-Yur'yev article is of particular interest as an example of the collation into a single whole of disparate data derived from a variety of sources.

We have reprinted below the complete substantive text of the article, omitting only the routine and tedious assurances of the "high state of vigilance of the Soviet people." (The original publication is dated July, 1970.)

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The Pentagon avoids any official mention of its space intelligence-gathering program. On the other hand, in commenting upon this aspect of US Defense Department activity, the Western press has cited the following facts.

Launchings of US intelligence-gathering satellites began in 1960. All such launches are conducted from the Vanderberg Missile Range (California). It is in fact the use of this range that has made it possible to place the satellites into

polar or near-polar orbits; such orbits provide a means of repeated overflights of the territory of the Soviet Union or of the countries of the socialist commonwealth. During the period from 1961 through 1969 the US launched more than 250 such intelligence-gathering satellites—more than 30 a year.

What are the missions of these spy-satellites? All of them are intended to acquire military and economic information regarding the defense posture of the Soviet Union and the other nations of the socialist camp; to maintain under constant surveillance the construction of military and industrial facilities; to reveal the deployment and disposition of aircraft at airfields, ships at their bases, and other military units; to monitor the activity of missile ranges and the launching from them of ballistic missiles; to study the antiaircraft defense system; to intercept radio traffic between military headquarters.

In the opinion of US authorities, the most effective means of acquiring such documentary information is through facility photography from outer space. The modern photographic equipment and highly sensitive fine-grained films which have been developed for this kind of intelligence activity perform with a high degree of efficiency. A camera, for example, has been designed in the United States which has a focal length of more than six meters. From an altitude of some 120 kilometers, a camera of this kind can photograph any object of a minimum size to two meters. Cameras of even greater focal length are being developed for use at even greater altitudes. These cameras are designed to be small and compact through the use of the so-called "folded optics" technique as well as prisms and periscopic devices. Clouds, on the other hand, pose an obstacle to space photography, and the procedure is, moreover, altogether impossible at night.

Several modifications of the "Samos" satellite have been employed in the United States for space photography. The first such satellite was launched in

1961. At the present time, the "Samos" configuration most commonly used measures 1.5 meters in diameters, 6.6 meters in length, and weighs 1360—1800 kilograms. The "Samos" constitutes a single design entity and is powered by a final-stage Agena booster.

The "Samos" has two fundamental missions: panoramic large-area photographic coverage and point facility reconnaissance. As a rule, the panoramic-coverage satellites are equipped with a wide-angle camera system of small focal distance and relatively low resolution. These satellites, which provide a high-altitude coverage swath or from 150 to 800 kilometers in width, carry a television system capable of transmitting information to ground stations even when the vehicle has traveled beyond direct line of sight. Some notion of the capabilities of modern television cameras is suggested by the coverage provided by "Lunar Orbiter 5," which from an altitude of 150 kilometers "detected" on the Moon's surface the trail of a rolling rock measuring approximately 4.5 meters.

Panoramic reconnaissance satellites are launched into a circular polar orbit to an altitude of 300—450 kilometers by means of a "Thor-Agena" rocket booster. Their lifetime may run anywhere from 20 to 25 days.

According to foreign press reports, the US has developed a new "Samos" modification for reconnaissance of specific facilities. The magazine Wings, published in New Zealand, reports that the US has been launching the improved "Samos" since 1966. A feature of this improved version is its ability to alter its orbital parameters on command from the Earth through the use of a special engine unit.

All "Samos" satellite types mount a minimum of two cameras, with the optical axis of one aligned on the Earth, that of the others on the stars, to provide a

precise frame of reference for the photographic coverage. The latest "Samos" configurations carry special radio-electronic sensors to automatically disengage the cameras whenever the facility being photographed is obscured by clouds.

The capabilities of intelligence-gathering spy satellites depend also on their supply of film. The most recent "Samos" models carry six film containers, each of which weighs more than 135 kilograms.

A few words now on the method whereby the equipment on this type of satellite is controlled and the exposed film recovered. The satellites are controlled from a Control Center located at Sunnyvale (California), with the information they provide received, processed, and analyzed by seven tracking stations. Several of the latter are situated in the Hawaian Islands and at Kodiac (Aleutians), at Grenier Field (United States), and in Japan.

When the satellite is located above a point of intelligence interest, the control center engages the cameras. Subsequently, a special command ejects the container holding the exposed film from the satellite earthward. After separation, a special thruster shifts the container from its original orbit to a descent trajectory. A heat-protective layer safeguards the container from overheating in the denser strata of the atmosphere. The rate of descent is decelerated by a ribbon-type drogue chute, with the container itself carrying a radio beacon and ejecting metal-plated strips to make possible rapid radar location. At an altitude of about 17,000 meters the container, from which the heat shield has been automatically separated, begins its descent on the main, orange-colored parachute. According to the press, the container recovery target area is located some 300 kilometers from the Hawaian Islands in the Pacific Ocean. The splashdown area is patrolled by a number of heavy C-130 aircraft equipped with special retrieval snares for catching the container in midair or plucking it from the water.

When all six containers have been returned to Earth, the satellite is "landed" by radar. The equipment it carries can then be reused.

American sources claim that extremely detailed pictures can be obtained by means of such photo-reconnaissance satellites. These photographs are said not only to reveal airfields, naval bases, and ICBM emplacements, but to provide a means of determining the number and type of the aircraft and naval vessels involved.

US commentators also indicate that another present-day area of priority importance is that of radio intelligence from space vehicles. In the opinion of these experts, electronic interception in all forms can provide intelligence specialists with invaluable information on the status of the enemy's armed forces, troop deployments, headquarter and control point locations, antiaircraft defense capabilities, etc.. These same commentators likewise see in radio intelligence satellites a tool of very wide and diversified potentiality. The state-of-the-art equipment with which they are equipped is said to be capable of distinguishing the number, disposition, and technical-tactical characteristics of enemy radars, in addition to providing a means of monitoring radio conversations between command echelons and surface vessels and submarines along with normal field-level radio traffic. Some reports have credited satellites with the relaying to Earth of information which they have in turn collected from penetration agents infiltrated into a specific country of interest.

Radio-electronic intelligence in the United States is conducted by the "Ferret" satellite, one of the modifications of the "Samos" already mentioned. The "Ferret" is lifted into a 400-to-700-kilometer-high polar circular orbit by a "Thor-Agena" booster, and has a lifetime of several years. This type of satellite is not returned to Earth. The electromagnetic signals and conversations which they intercept

are recorded on board the satellite itself for subsequent transmission to ground control centers for decoding and processing at such time as direct ultrashort-wave communication with these stations is established.

Those responsible for US intelligence-gathering activities have placed great faith in satellites of the "Midas" type equipped with infrared reconnaissance equipment. Through their help the Pentagon has hoped to learn the location of ICBM launch installations in the Soviet Union. For the three years following 1961 the US placed seven "Midas" satellites into elongated elliptical polar orbits with apogees of as much as 4800 and perigees of more than 500 kilometers. The American press has revealed that in 1963, using "Midas" satellites, the Air Force Command detected the launchings of "Atlas" and "Titan" missile launchings from the Atlantic and Pacific Missile Test Ranges. Still, despite the enormous costs of the program (the bill for the system being several billion dollars), no reliable "Midas" systems were developed, and the satellite equipment was unable to precisely pinpoint the missile launch sites. The resolving power of the IF detectors was extremely low and unable to distinguish missile heat radiation from solar radiation. At the present time, US research and development agencies have developed new versions of this equipment which are now undergoing testing at the missile ranges of that country.

The US has developed and is operating still another satellite system known as the "Vela Hotel" system. This is in effect a space radiation intelligence complex capable of detecting nuclear explosions on the Earth's surface and in outer space. The system consists of six satellites which monitor the radiation situation in space and report it to a control center on the Earth. The satellites of the "Vela Hotel" system are equipped with special optical sensors and are capable, according to foreign press reports, of detecting nuclear explosions of 1-megaton intensity. On the other hand, this system is not able to acquire information

on underground or underwater nuclear detonations.

US research and development efforts are also involved in a project known under its code name of "949." A total of 167 million dollars was allocated in 1970 ot this project. Again according to US press releases, the new satellite involved is to be a multipurpose vehicle, that is, one designed for the simultaneous execution of photo-reconnaissance, ballistic missile launch detection, and nuclear detonation recording missions. Actual launchings of the "949" satellite are expected in 1974....